Forest Insect & Disease Management

3400

1980 FOREST PEST MANAGEMENT

NURSERY REPORT

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INTRODUCTION

This report summarizes the forest pest management nursery activities at the St. Paul Field Office in 1980. The following activities are reported on:

National Mycorrhizae Pilot Test
Sirococcus and Diplodia Survey, Toumey Nursery
Soil Pathogen Survey, Wisconsin State Nurseries
Effects of Fumigation on Seedling Survival, Iowa State Nursery
Endemic Nursery Mycorrhizae
Walnut Root Rot, General Andrews Nursery
White Spruce Stunting, Eveleth Nursery
1980 Nursery Pest Surveillance Identifications.

NATIONAL MYCORRHIZAE PILOT TEST

The St. Paul Field Office continued to participate in the national Pisolithus tinctorius (P.t.) ectomycorrhizae nursery evaluation. The evaluation was designed to compare the effectiveness of P.t. inoculum produced by the Mycorrhizal Institute, Athens, Georgia, (GA P.t.) and Abbott Laboratories, Chicago, Illinois, (Abbott P.t.) for ectomycorrhizal formation, seedling growth and quality in the nursery, and tree survival and growth in subsequent field outplantings. Fumigated nursery beds were inoculated with either GA P.t. or Abbott P.t. at 100 and 200 ml per square foot of soil surface prior to planting. In May, 1980, 2-0 red pines were lifted from inoculated and control beds at Nepco Nursery, Port Edwards, Wisconsin and Potlatch Nursery, Cloquet, Minnesota. Seedlings were evaluated for amount of mycorrhizae and percent cull prior to outplanting.

NEPCO NURSERY

Nursery Bed Inoculum	GA 100	Abbott 100 & 200	Control
% seedlings with P.t.	72	44	0
% culls	30	34.5	49
Height (cm)	17.5	17.6	15.4
Stem Dia. (mm)	3.5	3.6	3.4
Fresh Wt. (g)	10.6	11.8	10.1

POTLATCH NURSERY

Nursery Bed Inoculum	GA 100	Control
% seedlings w/P.t.	98	0
% culls	18.6	24.4
Height (cm)	5.5	4.7
Stem Dia. (mm)	3.3	3.1
Fresh Wt. (g)	8.6	6.6

First year outplanting and survival growth data will be available in spring, 1981.

SIROCOCCUS AND DIPLODIA SURVEY, TOUMEY NURSERY

In July, a survey was conducted at Toumey Nursery, Watersmeet, Michigan, for Sirococcus shoot blight (Sirococcus strobilinus) of jack and red pines. The survey was initiated following the detection of Sirococcus infected jack pine seedlings at the Nursery in 1979. A cooperative evaluation was done with Dr. Thomas Nicholls of the North Central Forest Experiment Station. He conducted spore trapping and a fungicide spray test in conjunction with our detection survey.

Seedlings were infected by spores produced in large pines located near the nursery beds. Therefore, red and jack pines surrounding the nursery were surveyed to determine where inoculum was originating.

No jack pines were found to be infected, however, 21 red pines were observed to be infected with Sirococcus shoot blight. Infection was generally light on most trees. A combination of tree removal and pruning was recommended to control inoculum production.

Diplodia tip blight caused by the fungus Diplodia pinea, is another common shoot disease of pines. Spore inoculum often builds up on the cone scales of large pines. Therefore, to check D. pinea populations, jack pine cones were collected at the time of the Sirococcus survey. Upon laboratory examination no fruiting bodies were observed on the cone scales.

A separate report of this survey has been prepared.

SOIL PATHOGEN SURVEY, WISCONSIN STATE NURSERIES

State nurseries at Wisconsin Rapids and Boscabel were experiencing a root rot problem in their white pine beds. Previous work by Marge Palmer and Dr. Thomas Nicholls of the North Central Forest Experiment Station suggested that the root decay may have resulted from Cylindrocladium sp. infection. Therefore, a Cylindrocladium soil propagule evaluation was initiated by Forest Pest Management personnel to examine population levels in relation to disease severity.

The results indicated C. scoparium population levels corresponded with root rot severity at Wisconsin Rapids, however, no propagules were recovered for the Boscabel samples. Boscabel samples were retested for Fusarium species. F. solani was recovered in 7.0 percent of the samples. Although this fungus is often associated with conifer root decay, it remains unclear whether it is acting as a primary or secondary pathogen or as a saprophyte.

A separate and more detailed report has been written on this evaluation.

EFFECTS OF FUMIGATION ON SEEDING SURVIVAL, IOWA STATE NURSERY

An evaluation of the effects of soil fumigation on seedling survival and growth was conducted at the Iowa State Forest Nursery in conjunction with the Iowa Conservation Commission and Dr. Sande McNabb of Iowa State University. Nursery beds were fumigated in the fall of 1979 with Vorlex at 50 gal/acre, both tarped and nontarped, and with methyl bromide (MC-33) at 320 lb./acre tarped. Fumigated and control beds were seeded in spring 1980 with a single seed source of Scots pine. Plots of 30 square centimeters were established in each treatment regime and evaluated in June, July, and August. Total numbers of living and dead seedlings were recorded at each evaluation.

A report is currently being drafted by Dr. McNabb.

ENDEMIC NURSERY MYCORRHIZAE

During the 1980 field season a study was initiated to identify the species of mycorrhizal forming fungi in forest tree nurseries of the region. Nurseries in Minnesota, Michigan, Wisconsin, and Iowa participated in the survey. Nursery managers were asked to forward fungal fruiting bodies found in the nursery beds. In addition, they were asked to provide specific location information and seed bed histories.

Fruiting body samples were received from eight state and two federal nurseries. The collections included five mycorrhizae forming species; Entoloma sp., Boletus sp., Thelephora terrestris, Hebeloma arenosum, and Laccaria laccata. The later three species were collected at all nurseries and appeared in beds of red pine, jack pine, and white spruce of various ages. L. laccata and T. terrestris are both well known conifer nursery mycorrhizae formers. The other species, however, are not. A single Entoloma collection was made this season. It was found in 3-0 white spruce beds at General Andrews Nursery in Minnesota. Beds of other age classes and different tree species were examined, however, this fungus seemed to be limited to the older white spruce beds. Similarly, only one nursery, Wyman State, in Michigan, submitted Boletus collections. All three collections were from nonfumigated 3-0 red pine beds. The exclusive occurrence of these two fungi in 3-0 beds suggests that they may be late colonizers.

The information gained in this survey will be used to build a picture of the endemic nursery mycorrhizae of the Great Lakes region. As more cultural information is compiled it will be possible to determine which specific nursery practices, if any, are associated with the occurrence of fungi that form mycorrhizae. If we can determine the conditions that enhance mycorrhizae formation we may in turn determine the conditions that enhance seedling growth.

WALNUT ROOT ROT, GENERAL ANDREWS NURSERY

Walnut beds were inspected at General Andrews Nursery for possible root decay pathogens. This examination was precipitated due to the appearance of Phytophthora sp. winter storage symptoms the previous winter. In June, seedlings that showed typical Phytophthora root rot symptoms were collected from the beds and isolations were attempted. No Phytophthora was recovered. A second visit, later in the season, found no symptomatic trees in the beds.

WHITE SPRUCE STUNTING, EVELETH NURSERY

For a number of years, stunting of white spruce seedlings has been observed in tree nurseries in the Lake States region. In an attempt to establish the extent of this problem, study plots were established in 1978 at the Eveleth Nursery, Eveleth, Minnesota. A third year evaluation of these plots will occur in spring, 1981 and a final report will follow.

In addition to these plots, a new series of plots were established in 1-0 and 2-0 white spruce beds during the 1980 field season. Plots were identified as stunted or healthy. Trees within the stunted plots will be monitored for mortality or recovery while those in healthy plots will act as controls and be monitored for the possible onset of the stunted condition. Seedlings will be followed through outplanting and evaluated for seedling quality and survival.

1980 NURSERY PEST SURVEILLANCE REPORTS

Nursery	Tree Species	Pest
Eveleth, Superior N.F.	Red Pine	Diplodia tip blight
Eveleth	Pine wind rows	Pine-pine rust
General Andrews, MN DNR	Walnut	Winter storage decay
General Andrews	Jack pine	Sweet fern rust
General Andrews	Balsam fir & White spruce	Drought stress
Toumey, Ottawa N.F.	Hemlock	Spittlebug, weevil
Toumey	White spruce	Winter burn
Toumey	White spruce	Unknown, oak gall wasp
Toumey	Red pine	Unknown
Toumey	White spruce	Frost damage
Toumey	Oak	Aphids
Toumey	Jack pine	Unknown
Toumey	Jack & red pine	Sirococcus Shoot Blight & Diplodia Tip Blight
Toumey	None	Hairy fungus beetle
Union County, IL	Scots pine	Lophodermium needlecast